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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/801,900	03/09/2001	Yutaka Takeishi	A286-1	2596

466 7590 11/07/2002
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EXAMINER

DI GRAZIO, JEANNE A

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 11/07/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/801,900

Applicant(s)

TAKEISHI ET AL.

Examiner

Jeanne A. Di Grazio

Art Unit

2871

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

Foreign priority to Japanese Patent Application No. 2000-064532 of March 9, 2000 is acknowledged.

Specification

Please note spelling and or grammar suggestions to the specification.

Claim Objections

Claims 1, 20, 40, 41, 47, and 48 are objected to because of the following informalities: The words "to be" as found in "being to be mounted" should be deleted. Appropriate correction is required.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-39 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3-7, 9, 10, 13, and 23-25 of copending Application No. 09/739,236 in view of Asai et al. (USPN 6,409,159 B1) and in further view of McLaughlin et al. (USPN 4,699,470) and Muramatsu et al. (USPN 5,703,665].

Part I: Claims 1-39

Per claims 1-39 (summarized): The claims are drawn to a signal processing circuit substrate (“SUBSTRATE”) for an LCD unit, a variable device mounted on a surface of the substrate such that the device has a variable value and variable adjustment portion through which the variable value is adjusted, the substrate is formed with a through-hole, includes a flexible arch-shaped member with a height relative to said first surface of the substrate, includes a mounting member to which the device is electrically and mechanically connected such that the value adjustment portion faces a through-hole formed throughout the substrate and the mounting member is fixed at opposite edges onto the first substrate surface. The device is fixed to a surface in a floating condition above the substrate.

Concerning the mounting member: it is comprised of a flexible printed circuit, it is composed of flexible material, and the device is supported by the mounting member in a floating condition above the substrate. The mounting member is fixed at one corner onto said first surface of the substrate and fixed together with terminals of said device at three corners onto said first surface of the substrate. The mounting member is formed with means for preventing said mounting member from being wrongly fixed onto the substrate. The means includes three holes (or three projections or three marks) located in no rotational symmetry about a center of the mounting member. The mounting member is fixed onto the surface of the substrate by any one or more of soldering, application of an adhesive, screwing and welding.

Concerning the device: it is mounted on said mounting member such that said value adjustment portion does not project beyond a second surface of the substrate. The device is a resistor or capacitor or laser trimming resistor.

About the through-hole: it has an area such that an adjuster used for adjusting said value adjustment portion can move sufficiently to be engaged with said value adjustment portion through said through-hole. The area is equal to a sum of a first area actually occupied by the device and a second area in which the device is allowed to move.

A plate: is included for reinforcing said mounting member which plate absorbs a compressive force exerted on said mounting member when said value adjustment portion is adjusted. The plate is fixed onto the mounting member at the opposite side of the device.

Concerning reinforcing pads: a plurality (or at least two) which fix the mounting member onto the first surface of the substrate or located on a diagonal line passing through a center of the mounting member. The reinforcing pads are located adjacent to a bending of the member. The substrate includes four reinforcing pads located in rotational symmetry about a center of said member and adjacent to a bending of said member.

Discussion: Applicant's claims 1-3, 5, 17, 18, 20, 21, 23, 37, and 38 read on claims 1, 3-7, 9, 10, 13, and 23-25 of Application No. 09/739,236.

Per claims 4 and 22: The claims of Application No. 09/739,236 do not appear to disclose a mounting member fixed at a corner onto the first surface of the signal processing substrate and fixed together with terminals of said device at three corners onto the first surface of the signal processing substrate; however, Asai et al. discloses EC mounting heads that are equiangularly spaced apart from each other [Col. 7, Lines 16-17]. Asai et al. also discloses a plurality of support members each of which supports a printed circuit board on the side of one surface [Col. 2, Lines 41-44]. Furthermore, the use of three corners as a support mechanism has been previously accomplished in the art [For example, Muramatsu et al. USPN 5,703,665 discloses an electrode sheet supported at three points of an isosceles triangle]. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to arrange terminals on three corners because such a triangular arrangement is highly stable.

Per claims 6-7 and 24-25: The claims of Application No. 09/739,236 do not appear to disclose the specific area of the through-hole; however, McLaughlin et al. discloses a substrate having an opening through which a portion of a control element may extend [Col. 3, Lines 1-3]. Furthermore, McLaughlin et al. also discloses the use of, for example, a variable resistor to control applied voltage to a liquid crystal [Col. 4, Lines 11-14]. The variable resistor is the control element. Asai et al. also discloses a large area having a dimension greater than the height of all of the ECs mounted on a first surface of the printed circuit board [Col. 5, Lines 1-10]. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the area taught by Asai et al. in view of McLaughlin et al. to have an area large enough to be able to comfortably adjust resistance and thus applied voltage to the liquid crystal panel because it is always desirable to have components that can be easily replaced, tested, or adjusted.

Per claims 8-9 and 26-27: Asai et al. discloses a support that supports a printed circuit board and also acts a vibration inhibitor used to suppress vibrations to the printed circuit board. The vibration-damping device of Asai et al. supports the printed circuit board on a lower side. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate a plate for reducing vibrations to the printed circuit board.

Per claims 10-11 and 28-31: Asai et al. teaches the use of a plurality of printed circuit board supporting members [Col. 4, Lines 14-16]. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate reinforcing pads onto the mounting member and or printed circuit board because the more reinforcing pads are used, the more vibration is prevented. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to place the reinforcing pads on a diagonal line passing through the center of the mounting member to increase overall stability to the device [For example, refer to Muramatsu et al., USPN 5,703,665].

Asai et al. discloses the use of supporting members that should be located in a center of a mounting member to prevent sagging of the printed circuit board [Col. 1, Lines 21-26]. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to locate reinforcing pads near OR adjacent to a bending of a mounting member [as per claim 31] to prevent sagging and uneven distribution of solder.

Muramatsu et al. discloses the distribution of support members around a rotational symmetry of a mounting member for the purpose of reducing stress to the mounting member [Col. 2, Lines 1-3].

Per claims 12-15 and 32-35: Muramatsu et al. discloses three protrusions that are used to hold a liquid crystal panel and that prevent the panel from slipping [Col. 6, Lines 58-67]. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate means for preventing the mounting member from being wrongly fixed onto the substrate to prevent the mounting member from moving.

Per claims 16 and 36: Asai et al. discloses the use of a cream solder and adhesive as a means of adhering printed circuit boards and various support members. The use of soldering, application of an adhesive, screwing, and welding are common ways in which one adheres a mounting member onto a substrate surface.

Per claims 19 and 39: McLaughlin et al. discloses a variable resistor used to control applied voltage to a liquid crystal. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate any control device, including a laser trimming resistor, into an aperture so that one could easily control said device especially where one wants to control the device with precision and does not want to risk damage to the device and or the unit itself.

Per claim 20: Asai et al. comprises various flexible arch-shaped members with heights relative to the first surface of a given substrate.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 40-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anderson et al. (USPN 6,292,370 B1) in view of Asai et al. (USPN 6,409,159 B1) in further view of Muramatsu et al. (USPN 5,703,665) and McLaughlin et al. (USPN 4,699,470).

Part II: Method Claims 40-46

The method comprises the steps of: (a) mounting the device onto an upper surface of a flexible member such that the value adjustment portion upwardly faces; (b) bending said flexible member at first lines towards the lower surface; (c) bending the flexible member at second lines located between said device and first lines; and (d) fixing the flexible member at its opposite ends onto the substrate first surface such that a value adjustment portion is exposed through a through-hole formed through the substrate.

The method continues with: (e) fixing a reinforcing plate onto a lower surface of the flexible member, said step (e) carried out before step (d). The flexible member is fixed at one corner onto said first surface of the substrate and fixed together with terminals of said device at

three corners onto said first surface of the substrate in said step (d). The flexible member is fixed onto said first substrate surface such that said value adjustment portion does not project beyond a second surface of the substrate. The method further includes (f) fixing said flexible member onto said first surface of the substrate with a plurality of reinforcing pads. At least two reinforcing pads are located on a diagonal line passing through a center of said member, in said step (f). Four reinforcing pads are located in a rotational symmetry about a center of said member and adjacent to a bending of said flexible member in step (f).

Discussion: Anderson et al. does not appear to have an upward facing value adjustment portion; however, McLaughlin et al. does have a value adjustment portion. Anderson et al. discloses an illustration of steps (b) through (d). See Anderson et al. Figure 4. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify Anderson et al. in view of McLaughlin et al. to include a value adjustment portion into the Anderson et al. flexible circuit board because the bent structures included in Anderson et al. provide convenient apertures through which a value adjustment portion could extend.

Per claims 41-46: These elements have previously been addressed with respect to claims 4, 5, 8, 9, 10, 11, and 31.

Claims 47-54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goshima (USPN 6,316,731 B1) in view of Anderson et al. (USPN 6,292,370 B1) in further view of Asai et al. (USPN 6,409,159 B1), McLaughlin et al. (USPN 4,699,470) and Muramatsu et al. (USPN 5,703,665).

Part III: Method claims 47-54

The method has the following steps: (a) patterning a flexible printed circuit sheet into patterns which will make flexible printed circuits; (b) covering said flexible printed circuit sheet with an electrical insulator; (c) mounting said device on a second surface of said flexible printed circuit sheet; (d) cutting said flexible printed circuit sheet into flexible printed circuits; (e) downwardly bending said flexible printed circuit sheet at first lines across said device; (f) upwardly bending said flexible printed circuit sheet at second lines across said device, said second lines being located between said device and said first lines; and (g) fixing said flexible

Art Unit: 2871

printed circuit sheet onto said substrate first surface such that said value adjustment portion is in alignment with a through-hole formed throughout said substrate.

The method continues: (h) adhering a reinforcing plate on a first surface of the flexible printed circuit sheet across a width of said sheet, said step (h) being carried out prior to said step (d). The method further comprises the step of (i) forming marks located in no rotational symmetry about a center of said printed circuit sheet. Said marks are comprised of holes, and said step (i) is carried out concurrently with step (d). The flexible printed circuit is fixed onto the substrate such that said value adjustment portion does not project beyond a second surface of the substrate. The method further includes fixing said flexible printed circuit onto said first surface of the substrate with a plurality of reinforcing pads. At least two reinforcing pads are located on a diagonal line passing through a center of the flexible printed circuit. Four reinforcing pads are located in a rotational symmetry about a center of said flexible printed circuit and adjacent to said second lines of said flexible printed circuit.

Discussion: Patterning a flexible printed sheet into patterns which will make printed circuits is a common step in the art. For example, Goshima discloses such a step [Col. 1, Lines 47-55]. Covering a flexible printed circuit sheet with an electrical insulator is common in the art. For example, Goshima discloses a printed wiring board with a film formed on the board [Col. 4, Lines 65-66]. Goshima does not appear to have a variable device mounted on a second surface of the flexible printed circuit sheet; however, Goshima does have a highly effective alignment technique for aligning a circuit board through-hole and circuit pattern film [Col. 3, Lines 29-34]. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate a variable device into the invention as disclosed by Goshima because an effective alignment would make it more efficient and easier to control any given variable device. Cutting of a flexible printed circuit sheet into flexible printed circuits is a step common in the art [See, for example, Degani et al. (USPN 6,370,766 B1) at Col. 1, Lines 46-53]. The steps of downwardly bending a flexible printed circuit sheet and upwardly bending a printed circuit sheet have been previously addressed with respect to the Anderson et al. reference. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate the steps of 'bending' into the Goshima reference prior to any step of alignment to reduce stress to the overall unit and so as to not interfere with final alignment. Goshima does not appear to have

Art Unit: 2871

a value adjustment portion; however, Goshima does disclose a highly effective alignment technique for aligning of a through-hole. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to align a value adjustment portion with a through-hole in view of Goshima because Goshima specifically teaches a highly effective alignment technique.

The step of incorporating a reinforcing plate has been previously addressed with respect to the Asai et al. reference. It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to incorporate a reinforcing plate prior to the step of cutting, in view of Asai et al., for manufacturing ease.

With respect to the marks / holes on the printed circuit sheet, Goshima discloses the use of marks as an alignment means. Figure 10 of Goshima further teaches a series of marks on a printed circuit sheet. Goshima does not appear to teach the concurrent forming of marks and cutting of the printed circuit sheet into circuit boards; however, it would have been obvious to one of ordinary skill in the art at the time the invention was made to concurrently form marks and cut the circuit sheet so as to not disturb alignment.

The elements of claims 51-54 have been previously addressed with respect to the cited references.

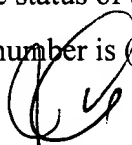
Art Unit: 2871

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeanne A. Di Grazio whose telephone number is (703)305-7009. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Sikes can be reached on (703)308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are (703)746-8741 for regular communications and (703)746-8741 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Jeanne Andrea Di Grazio



James A. Dudek, Primary Examiner

JDG

October 24, 2002